STATE OF CALIFORNIA -BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

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September 23, 2003 DOCKET # 03 – BSTD – 1

California Energy Commission
Attention: Docket No. 03 – BSTD – 1
Dockets Office
1516 Ninth Street, Mail Station 4
Sacramento, CA 95814

Department of Housing and Community Development
Comments on Proposed Title 24, Part 6, 2005 Amendments

Following a review of the Express Terms, Initial Statement of Reasons and the Notice of Proposed Action for the Energy Commission's 2005 Energy Code proposal, the Department of Housing and Community Development (HCD) offers the following comments for consideration prior to the Energy Commission's action.

New Construction

§150 (j) Water Piping and Cooling System Line Insulation Thickness and Conductivity

Proposed §150 (j) 2 states in part: ..."and all hot water pipes from the heating sourse to the kitchen for nonrecirculating systems; and cooling system lines shall be thermally insulated..."

Comment 1: The existing building standards, §150 (j) 2, requires the first five feet of a hot and cold water piping extending from the water heater to be insulated. The current building standard is clear and the user of the code understands exactly how much water piping must be insulated. We find the proposed language confusing to the user and believe enforcement officials must make a judgment call on each hot water piping installation inspected.

For example, when the water piping is run overhead from the water heater, located in the garage, to the kitchen, located at the opposite end of the residence, does the piping insulation terminate at the point the water piping enters the area directly above the kitchen; or must the piping insulation extend to a point where the water piping penetrates the wall adjacent the kitchen sink? There would be a significant amount of water piping that is not insulated should the installer terminate the piping insulation at the point the water piping enters the area directly above the kitchen verses installing piping insulation on the hot water piping all the way to the kitchen sink faucet.

We believe the proposed amendments as written inappropriately causes and installer and enforcement officials to make a determination as to where the piping insulation must terminate. This results in inconsistent and erroneous installations and will also result in over or under enforcement of the building standard by the enforcement agency. The proposed building standard must be written with sufficient clarity to enable the reader to definitively and accurately apply the requirement.

- **Recommendation 1:** HCD recommends that this proposed language be modified to identify a specific point at which the piping insulation for the hot water piping run to the kitchen may be terminated. To that end, HCD offers the following change to the language proposed by the CEC for §150(j)2.:

  ..."and all hot water pipes from the heating ~~sourse~~ ***source*** to ***the first point within the kitchen area inside the conditioned air envelope*** ~~the kitchen~~ for nonrecirculating systems; and cooling system lines shall be thermally insulated..."

Comment 2: The proposed additional insulation materials would increase the construction cost approximately $25.00 to $50.00 per dwelling unit, based on an estimate from "Home Depot" a construction materials retail supplier. The additional costs estimates would be typical of a 1,500 square foot dwelling unit and do not include additional labor costs. Attempts to gain labor costs from several plumbing contractors in the Sacramento area were made by HCD staff members. However, none of the contractors were able to provide estimates on the labor costs involved with installing the piping insulation.

- **Recommendation 2:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their state objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' Life Cycle Cost analysis (LCC)).

  Note: The costs of adding any individual feature may seem insignificant or even cost effective by itself until considered with the collective costs included with these proposed building standard amendments.

§150 (k) Residential Lighting

Proposed §150 (k) contains requirements for residential lighting that will be substantially revised to require high efficacy (a new method for determining high efficiency in light fixtures and lighting systems) lighting equipment and/or energy savings controls for permanently installed luminaries with specific exceptions. Additionally, this proposal will require recessed luminaries in insulated ceilings be sealed between the (Light fixture) housing and the ceiling.

Comment 3: HCD is concerned over the increase in construction cost. A cost analysis conducted by the California Building Industry Association (CBIA) for this proposed section reveals the cost for compliance would be approximately $400 per dwelling unit. This figure represents the initial cost for materials only. The Energy Commission's staff reports and industry studies relied upon suggests the added energy savings will be in excess of the compliance costs. However, the costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt. HCD is concerned over the total cost increases contained in this proposed rulemaking that impacts the affordability of housing.

The table below, from the *Lithonia Lighting Group*, (a light fixture and lighting systems manufacture) provides an example of the product ongoing cost and the energy cost savings over a six-year period of use. However, this example does not take into account the initial added cost of the lighting equipment.

Hours/Day - 6 Years	100W Incandescent	25W Compact Fluorescent
Purchase Price	**$0.99**	**$11.00**
	146.0 kilowatt-hours	**36.5 kilowatt-hours**
Total Lamp Cost	**$10.89**	**$11.00**
Total Energy Cost (at 8¢/kilowatthour)	**$70.08**	**$17.52**
TOTAL COSTS:	**$80.97**	**$28.52**

Energy Cost Savings: $ 52.45 (over 6-years)

NOTE: HCD using this theory estimates that it would take 45.62 years to recover just the initial materials cost of approximately $400 per dwelling unit.

- **Recommendation 3:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the CEC's LCC.)

Comment 4: HCD is concerned over the proposed requirement for airtight recessed lights contained in *§150 (k) 5.* The process to mitigate air infiltration involves sealing the light fixture housing to the ceiling of the room where the light fixture is being installed. We believe this requirement would make it impossible for enforcement officials to fully inspect and determine compliance with all applicable regulations without requiring the installer to remove the sealing material from around the fixture housing or coordinate inspection with the installation of the light fixtures. This would result in additional costs to the installer by having to reinstall fixtures after being inspected or unreasonable delays to installation waiting for both the installer and inspector to coordinate their times. The added costs would be passed directly to the consumer/homebuyer thereby unnecessarily add to the overall cost to housing.

- **Recommendation 4:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' LCC.)

Prescriptive Standards

§151 (f) 3. Fenestration Glazing

Proposed §151 (f) 3 will specify using area-weighted average U-factors to comply with U-factor requirements. The U-factor requirements in Energy Component Package (Package) D are proposed to match the new National Fenestration Rating Council's test procedures. The maximum fenestration area requirements in Package D are proposed to be 20% in all climate zones. In specific climate zones with substantial summer cooling energy use, the west-facing fenestration area in Package D will be limited to 5% of the conditioned floor area.

Comment 5: The existing code §151 (f) 3. refers to U-factors equal to or lower than those shown in Tables 1-Z1 through 1-Z16 and B. Total glazing area shall not exceed the percentage of conditioned floor area specified in

Tables 1-Z1 through 1-Z16. The maximum fenestration area requirements in Package D are 16%-20% depending on the climate zone. To revise the areas in all Zones to 20 % would be an increase in fenestration cost to those Zones not currently at the 20% level.

HCD recognizes this new energy feature as adding a considerable negative impact to the affordability of housing throughout the state. The housing costs affects, not only the individual homebuyer, but also the construction business as a whole. The new window requirements will increase the cost to the consumer, as mentioned by several fenestration industry representatives at CEC workshops to be approximately $50.00 or more per window for a 4'-0"x4'-0" slider, over a dual pane window of the same size. This cost increase will vary for different sizes and windows.

However, assuming an average 3- bedroom single-family home has 10 windows through out the house, the additional construction cost for the house will be approximately $500.The initial cost to the consumer/homebuyer shown in the example above, may be recovered by the energy savings depicted in the LCC. CEC indicated in a correspondence to the Department, dated September 2, 2003, that the total energy savings developed into this entire rulemaking package for a single-family residence is estimated to be $1,543.00 - $3,500 based on the LCC of 30 years.

- **Recommendation 5:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' 30-year Life Cycle Cost analysis (LCC)).

§151 (f) 7. Space Heating and Space Cooling

The proposed amendments to §151 (f) 7. concerning air conditioners and ducted split system heat pumps will require these appliances being installed in new homes to meet new federal appliance standards as specified in the Appliance Efficiency Regulations (Title 20, Section 1601 et seq. of the California Code of Regulations).

Comment 6: The existing code §151 (f) 7. allows for 10 SEER (Seasonal Energy Efficiency Ratio) air conditioning units to be installed per Tables 1-Z1 through 1-Z16. The new federal appliance standards require a minimum 12 SEER unit be installed in any federal building where a new unit is installed. The cost increase is estimated at $1000 to $2000 more than the existing 10 Seer Unit. This cost average can vary depending on an 80% or 90% efficiency appliance as well as the size of the dwelling unit and covers initial purchase cost only. The cost of implementing this proposed building standard must be added to the total energy feature costs for a new single-family residence. The current estimates from ITES Heating & Air Conditioning of Sacramento and American Comfort Heating & Cooling of Sacramento are as follows:

10 Seer/ 3 -Ton Unit	Basic 80% Efficiency	$4000 To $5000 installed
12 Seer/3 - Ton Unit	Basic 80% Efficiency	$5000 To $6000 installed

The initial cost to the consumer/homebuyer may be recovered by the energy savings depicted in the CEC's LCC. In their correspondence to the Department dated September 2, 2003, the CEC, indicated that the total energy savings for a single-family residence will be $1,543.00 - $3,500 based on the 30 years LCC. However, due to the life expectancy of the air conditioning appliance installed in a dwelling unit being far less than 30 year, HCD is concerned with using these energy saving figures for the period covered by the LCC recovery estimates.

- **Recommendation 6:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include all additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure as well as appliance replacement costs, estimated to be 1.5 times, during this same 30-year period. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' 30-year Life Cycle Cost analysis (LCC)).

§151(f) 8. Water-Heating Systems

The proposed amendments to §151(f) 8. concerning water heaters, will require these appliances being installed in new homes to meet new appliance standards for federal buildings as specified in the Appliance Efficiency Regulations contained in Title 20 CCR.

Comment 7: A study prepared by CBIA, indicates the initial increase in cost of upgrading to the federal standards to be approximately $100-$200 per water heater, depending on the size and/or efficiency of the appliance. The CEC costs estimates are based on the total cost rather than just the increase costs; therefore, it is not known what the CEC estimates the increases in costs are for this proposed building standard. However, the total feature cost impact, assuming this includes current costs, on a single-family residence is estimated by the CEC to be $475-$1075.

- **Recommendation 7:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable methods to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' 30-year Life Cycle Cost analysis (LCC)).

§151 (f) 10. Space Conditioning Ducts

Proposed amendments to §151 (f) 10. would modify duct insulation requirements. R8 insulation around all ducts would be required in all climate zones statewide when subject to Energy Component Package (Package) C. Package D will require R4.2 insulation around ducts installed in climate zones 6, 7, and 8; R6 insulation around ducts installed in climate zones 1-5, and 9-13; and R8 insulation around ducts installed in climate zones 14, 15 and 16.

Comment 8: Existing building standard §151(f)1. for duct insulation refers to existing provisions in §150 (m) that allows ducts to be insulated to an R4.2. The proposed revision therefore reflects a major change to this section with major impact on the overall costs. The Department of Housing and Community Development is concerned about the 30-year LCC as compared to the actual cost projections developed by industry representatives. The

analysis for other proposed energy features should also be reviewed by industry to assure all costs are accurately depicted.

On August 27, 2003, the CEC issued their "Revised Cost Effectiveness Analysis/Residential Duct Insulation. This revised analysis indicates the original analysis underestimated the cost increases for additional duct R-values. The cost shown in the table below represents a substantial increase, particularly when added to the total energy feature costs. Correspondence to HCD from CBIA estimated the cost for complying with this proposed standard could increase depending on the Energy Component Packages used in various allowable options as follows:

> *"If a builder does not want to utilize the 'third party" inspection option for ducts and wall/ceiling insulation, the compliance cost will jump to $1,707. In addition, if that builder also chooses not to go with on- coat stucco, the compliance cost jumps to a high of $2,368".*

Table - Cost of Increased Duct Insulation Materials.

Insulation R – Value	Increased cost to Homebuyer for 1761 sq.ft. prototype Original Estimate	Revised Estimate
R - 6	$ 65	$ 100
R - 8	$ 108	$ 600

The increase shown in the revision above is a substantial increase in the cost of materials that will affect the affordability of residential dwelling units statewide. Added to these costs is the necessary duct testing costs of $135 to $225.

- **Recommendation 8:** The Energy Commission staff reports and industry studies suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. The costs used by these sources do not include additional costs a homebuyer will incur with financing the additional debt when a loan is amortized over a 30-year period or the economic life of the structure. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing. Therefore, we recommend that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing while achieving their stated objectives in reducing overall energy demands. (Refer to the overall cost analysis developed by HCD included on page 11 of this document to see the projected amortized cost compared with the California Energy Commissions' 30-year LCC)).

Additions and Alterations to Existing Buildings

Additions
§151 (f) and §152 (a) 1. Prescriptive Approach
The proposed amendments to §151 (f) and §152 (a) 1 requires fenestration in additions up to 100 square feet meet the U-factor requirements in Energy Component Package D. (Sections 151 (f) 3 A, 151 (f) 4 and TABLE 151-C).

Comment 9: Existing building standard §152 (a) 1.A. limits additions up to 100 square feet to not exceed 50 square feet of glazing, the glazing U-factor shall not exceed 0.75, and the glazing SHGC shall not exceed the value specified in Alternative Component Package D (Tables 1-Z! through 1-Z16).

HCD associates this new energy feature with adding a considerable negative impact to the affordability of maintaining existing housing throughout the state. The housing costs affect not only the individual homeowner, but also the construction business as a whole. As noted by several fenestration industry representatives at CEC

workshops, the new window requirements will increase the costs to the consumer by approximately $50.00 or more per window when upgrading from a dual pain window to a window with dual pane Low-E glazing. (Example: A 4'-0" x 4'-0" dual pane, Aluminum frame slider can be purchased for $93, while a 4'-0" x 4'-0" dual pane Low-E, Vinyl slider costs $143. The additional cost to comply with this proposed standard is $50 for one window alone.)

> **Note**: An HCD Staff member obtained these material costs from Home Depot in May 2003 and costs will vary for different sizes of window.

HCD is also concerned over the issue of a dwelling unit owner having to install a window that will not correspond to the existing windows in the structure. Besides being esthetically unpleasing to look at, many local development CC&Rs will not allow a dwelling unit's exterior scheme to be modified without modifying the entire existing exterior schemes including window to be uniform. In this instance the homeowner needing to replace one window would be forced to change out all existing windows in order to maintain a complete exterior scheme. This would add an additional $7,000 to $12,000 to the cost of a small addition to an existing dwelling unit.

A dwelling unit owner may recover a portion of the cost shown in the example above, by the energy savings depicted in the LCC. However, as indicated in correspondence dated September 2, 2003 the CEC estimates that the total energy savings for a single-family residence is between $1,543.00 and $3,500 based on the 30-year LCC. The total savings would not come close to the initial $7,000 - $12,000 a homeowner may be required to spend on window replacements under this building standard.

- **Recommendation 9:** The Department of Housing and Community Development is concerned with the affordability of housing maintenance and the costs associated with maintaining a dwelling unit. The cost associated with this proposed building standard adversely affects a dwelling owner's affordability to replace worn out or deteriorated windows. The Energy Commission staff reports suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. However, those energy savings over a 30-year period will not begin to cover the costs of replacing all windows in the dwelling unit. In addition, the energy savings expressed by the CEC do not cover any additional costs a dwelling unit owner will incur amortized over the life of a loan or the economic life of the structure when financing the additional debt. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing ownership as well as maintenance. Therefore, HCD recommends eliminating this proposed amendment and that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing maintenance while achieving their stated objectives in reducing overall energy demands.

§152 (a) 2 B. Performance Approach
Under the proposed building standard §152 (a) 2. B. when the builder chooses to show compliance for an addition by upgrading a component of the existing building to compensate for failing to meet a prescriptive requirement applicable to additions, the upgraded component in the existing building will be required to meet the proposed requirements for alterations. Therefore, when ducts are extended from an existing duct system to serve an addition, all ducts being extended to the addition must meet the duct insulation requirements for alterations to existing duct systems.

Comment 10: Existing building standard §152 (a) 2 B accepts an addition as complying with the code if the energy efficiency of the existing building is improved such that the source energy consumption of the improved existing building and the addition is equal to or less than that of the unimproved existing building plus and addition that complies with the applicable energy budget.

The Department of Housing and Community Development has reviewed the standard referenced in the above section for alterations to existing duct systems. The proposed requirements, increasing duct insulation to R-8, along with sealing and testing of all ducts by a certified CHEERS (California Home Energy Efficiency Rating System) tester, is estimated to increase the cost to the consumer as follows:

CEC, using the MICROPAS energy analysis computer program:
Duct insulation initial cost R6 = $100 for dwelling unit
Duct insulation initial cost R8 = $600 for dwelling unit.

Rick Lee, Certified Energy Star Rater, Beutler Heating and Air
Test Duct systems $ 55 an hour- 2 hr. minimum = $110
CHEERS T-24 Rating $25-$50 per dwelling unit
Total cost = $125-$225

- **Recommendation 10:** HCD recommends further study to find possible solutions in reducing the initial costs to the consumer/homeowner. HCD takes note of the possible recovery of initial cost through the energy savings projected by the Life Cycle Cost analysis. However, we continue to be concerned with how the affordable housing aspect of this feature is being negatively affected by the cumulative cost of all the proposed building standards added together. Due to the substantial additional costs and limited cost recoveries associated with this proposed amendment, HCD recommends eliminating this proposed amendment and CEC conduct further study to determine a more cost effective way of achieving its objectives.

Alterations

§152 (b) 1. Prescriptive Approach
Proposed §152(b)1. mandates that when replacing an entire window in a residential dwelling unit the replacement window must meet the proposed building standard for new fenestration.

Alterations that add fenestration area will be required to meet the U-factor, fenestration area, and SHGC requirements of Energy Component Package (Package) D with the exception of increases in fenestration area up to 50 square feet. Replacement fenestration, where all the glazing in an existing fenestration opening is replaced with a new manufactured fenestration product, will be required to meet the new U-factor and SHGC requirements of Package D. Glass replaced in an existing sash and frame or replacement of a single sash in a multi-sash fenestration product are considered repairs, which are not required to comply.

Comment 11: Existing building standard §152 (b) 1A, allows added fenestration area to an existing building and mandates compliance limited to a maximum of 0.75 U-factor and the Solar Heat Gain Coefficient for new fenestration products as specified in Alternative Component Package D (Tables 1-Z1 through 1-Z16). Existing Code §152 (b) 2B states:

> *Note: Fenestration products repaired or replaced, not as part of an alteration, need not comply with the U-factor and Solar Heat Gain Coefficient requirements applicable to alterations.*

The proposed standard requires the U-factors in package D be updated to match the new National Fenestration Rating Council's test procedures. HCD recognizes this new energy feature as adding a considerable negative impact to the affordability of housing maintenance throughout the state. The costs affect not only the individual dwelling unit owner, but also the construction business as a whole. The new window requirements will increase the cost housing maintenance, as mentioned by several fenestration industry representatives at CEC workshops by approximately $50.00 or more per window for a 4'-0"x4'-0" slider, over a dual pane window of the same size. This cost increase will vary for different sizes and windows.

The example below illustrates the wide range of window costs with different type glazing. An HCD staff member obtained the cost figures from Home Depot in May 2003.

Window Size	Type of Frame	Type of Glazing	Cost
4'0"x 4'0" slider (16 square feet)	Aluminum- W/O Grids	Single Pane	$ 48.00
4'0"x 4'0" slider (16 square feet)	Aluminum- W/O Grids	Dual Pane	$ 93.00
4'0"x 4'0" slider (16 square feet)	Vinyl – W/O Grids	Dual Pane	$ 117.00
4'0"x 4'0" slider (16 square feet)	Vinyl – W/O Grids	Dual Pane/Low-E	$ 143.00

To summarize the additional costs incurred when complying with the proposed new fenestration building standards verses replacing a window with one of "like kind" that complied with the building standards in place at the time the building was constructed, the costs in the given example raises from $3 per square foot for a single pane glazing to $8.94 per square foot for dual-pane Low-E glazing. That represents nearly a 300% increase in costs and is a disincentive to an owner to maintain the dwelling units.

HCD is also concerned over the issue of a dwelling unit owner having to install a window that will not correspond to the existing windows in the structure. Besides being esthetically unpleasing to look at, many local development CC&Rs will not allow a dwelling unit's exterior scheme to be modified without modifying the entire existing exterior schemes including window to be uniform. In this instance the dwelling unit owner needing to replace one window would be forced to change out all existing windows in order to maintain a constant exterior scheme. This would add an additional $7,000 to $12,000 to the cost of a small addition to an existing dwelling unit.

A dwelling unit owner may recover a portion of the cost shown in the example above, by the energy savings depicted in the LCC. However, as indicated in correspondence dated September 2, 2003 the CEC estimates that the total energy savings for a single-family residence is between $1,543.00 and $3,500 based on the 30-year LCC. The total savings would not come close to the initial $7,000 - $12,000 a homeowner may be required to spend on window replacements under this building standard.

As an alternative to replacing all windows, a dwelling unit owner may choose not to replace any windows when necessary thereby allowing the dwelling unit to deteriorate and eventually become sub-standard. Another alternative a dwelling owner may choose would be to ignore the building standard and replace a window with materials in kind. Enforcement of the proposed building standards by an enforcement agency would be nearly impossible because few enforcement agencies require building permits to replace a window in a dwelling.

- **Recommendation 11:** The Department of Housing and Community Development is concerned with the affordability of housing maintenance and the costs associated with maintaining a dwelling unit. The cost associated with this proposed building standard adversely affects a dwelling owner's affordability to replace worn out or deteriorated windows. The Energy Commission staff reports suggest energy savings in excess of the compliance costs will mitigate the initial cost of this feature. However, those energy savings over a 30-year period will not begin to cover the costs of replacing all windows in the dwelling unit. In addition, the energy savings expressed by the CEC do not cover any additional costs a dwelling unit owner will incur amortized over the life of a loan or the economic life of the structure when financing the additional debt. The CEC's Notice of Proposed Action, dated July 2003, for this regulatory proposal includes the following statement on page 16 of that document:

  "The Standards must be cost effective when taken in their entirety and when amortized over the economic life of the structure when compared to historic practice."

  HCD is concerned over the total cost increases contained in this proposed rulemaking that impact the affordability of housing ownership as well as maintenance. Therefore, HCD recommends eliminating this proposed amendment and that the CEC conduct further study to find viable means to reduce the total financial impact on the overall cost to housing maintenance while achieving their stated objectives in reducing overall energy demands. If further study is rejected and the Commission proceeds with adopting of this building standard, HCD recommends this proposed standard be amended and include the current Note contained in *§152 (b) 2B* which allows the replacement of like materials for fenestration repair or replacement.

§152 (b) 1.D Prescriptive Approach
Proposed building standard §152 (b) 1D, will require new or replacement space conditioning ducts of 40 feet or more installed to serve an existing building, to meet the proposed building standards in §150 (m) for new construction. The combined new and existing duct system will be required to be sealed, tested, and field verified. Ducts that form entirely new duct systems will be sealed to meet the prescriptive requirements for newly constructed buildings. New ducts that extend an existing duct system must comply with one of three options provided.

It is possible that none of the three options for extensions of existing duct systems can be achieved. If that is the case, compliance will require that a certified HERS rater verifies through observation and a smoke test that all accessible leaks have been sealed. Duct sealing will not be required when an existing duct system being extended is constructed, insulated, or sealed with asbestos.

When a space conditioning system is altered by the installation or replacement of space conditioning equipment, including replacement of an air handler, cooling or heating coil, or furnace heat exchanger, the existing duct system that is connected to that new or replaced space conditioning equipment will be required to be sealed, tested and verified to the same requirements of new ducts that extend an existing duct system.

Duct sealing will not be required when only a new outdoor condensing unit of a split system air conditioner or heat pump is installed; when the existing duct system is documented to have been previously sealed, tested and field verified; when the existing duct system is less than 40 linear feet in unconditioned spaces or when the existing duct system is constructed, insulated or sealed with asbestos.

Comment 12: Proposed building standard § 152(b)1.D will require existing HVAC ducts to be tested and sealed at a cost, estimated by the CEC, and industry representatives to be as follows:

CEC Estimates:	Duct Sealing Cost $660 LCC Savings $2,197 - $2,784
PARK Mechanical:	Duct Sealing Cost $1,800 No estimated savings.
CEC Estimates:	Duct Sealing and Duct Insulation Cost $760 - $1260 (depends on climate) Savings $2,400 - $3200
PARK Mechanical:	Duct Sealing and Duct Insulation Cost $2200 - $2800 (depends on climate) No estimated savings.

Costs of HERS Rater: Test Duct systems $ 55 an hour- 2 hr. minimum
CHEERS T-24 Rating $25-$50 a house
Total cost = $135-$225
(Information on HERS provided by Rick Lee, Certified Energy Star Rater, Beutler Heating and Air)

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The additional costs to the homeowner, represented in the figures above, may cause some existing homeowners to violate local permit requirements by installing the appliances without obtaining permits. The cost of replacing or repairing and sealing the ducts could be as much or more than the cost of a new appliance appliance.

- **Recommendation 12:** These examples indicate the cost to the consumer could be significantly higher than the costs provided by the CEC. HCD recommends eliminating this proposed amendment and that the CEC conduct further study to determine a more cost effective way of achieving its objectives. HCD also recommends further study in order to assure compliance with the stated determination on page 16 of the Notice of Proposed Action dated July 2003 that *"Homeowners and occupants will be the beneficiaries of energy bill savings substantially in excess of compliance costs making housing more affordable."*

The following financial analysis developed by HCD reflects costs and forecasted energy savings identified by the CEC, as well as unidentified costs that the Department believes must be considered when analyzing the total financial impact of these proposed building standards on the overall cost of housing in California. The costs shown are only some of the costs included in the proposed building standards and are based on the "new dwelling unit" construction costs increases as discussed in comments 1 through 8 of this document. Additions and/or alteration cost for existing dwelling units have similar fiscal impacts on the dwelling unit owner. However, those costs are not included in the analysis below.

Proposed New Construction Items	Low Cost Estimate	High Cost Estimate
§150(j)2: Hot Water Pipe Insulation	$25	$50
§150(k): Residential Lighting	$400	$400
§151(f)3: Low-E Windows	$500	$1,000
§151(f)7: 12 Seer vs. 10 Seer A/C	$1,000	$2,000
§151(f)8: Water Heater	$100	$200
§151(f)10: Air Duct Insulation	$600	$2,368
Initial Additional Costs to Housing Associated with Only the Listed Items	**$2,125**	**$5,818**
Projected Amortized Costs over 30 Years Interest Rate Figured @ 6%	**$2,461**	**$6,740**
Total Cost to New Housing Before Energy Savings	**$4,586**	**$12,458**
CEC Estimated Savings in Reduced Energy Costs (30 Year LLC)	**$1,543**	**$3,500**
Total Fiscal Impact to the Cost of Housing from Items Listed Above Without Energy Savings Payback.	**$3,043**	**$8,958**

We would like to take this occasion to thank the California Energy Commission for giving us an opportunity to comment of these very important proposed amendments to the California Energy Code. If there are any questions concerning our comments or if our staff may be of further assistance, please contact our Housing Standards Programs Manager, Chris Anderson. Mr. Anderson's phone number is (916) 445-9471 or he may be reached by email at: canderso@hcd.ca.gov

Sincerely,

Norman Sorensen

Norman Sorensen
Deputy Director